An Inaugural Essay
on
The Function of the Brain.

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In the thin line of nerv-
-ous matter of the hydra we read the
prophecy of the convoluted brain of
the mammal, and of man.

It is a prophecy written in
the constitution of things, and affords
to contemplation a splendid survey when
it reads in the positive symbols of na-
ture the efforts she puts forth to shape
the perfected brain out of the crude
elements. From matter, we ascend to
mind through the brain. It furnish-
es the only gateway through which
we can pass. Here the living pro-
cesses terminate in a cynosure
of perfection.

The human brain is surround
ed by a halo of power. It overturns

mountains- dries up seas- recreates- improves and revises the works of nature; and enthrones itself a Deity in the material world. The human brain with every beat diffuses thought, plans, improves, and models, schemes for the emancipation of suffering and distress. It is the emblem of that eternal pulsating brain of the universe; whose thoughts are immutable laws, and on whose magnetic streams, fleets of suns, and worlds are wafted as toys on the oceans breast.

In treating of the brain proper, we speak of it as situated at the summit of the nervous system- the great centre in which

all the ganglia are represented, and which wills, and controls the whole body. In investigating the human brain, we will at once be impressed with the great development of the cerebral ganglia, and the compression, and consolidation we observe. Reposing upon the other ganglia, and completely enveloping them, is the cerebrum - the acknowledged organ of thought, and therefore the most interesting part of the whole nervous system.

Physiologists have endeavored by various methods to find out the true function of the brain, and nervous system generally; and have generally studied the subject in the

same manner they would the function of any other physical organ.
The method of vivasection, though cruel, and leading to results comparatively unimportant, has been the source of many useful hints upon this subject. And the study of the comparative development in the lower animals, has contributed largely to our stock of knowledge.
The enormous growth of man's cerebrum, carries him far beyond the animal, in mental development. Not only is the coronal, and frontal portion enlarged, but between, and reposing upon these, lies an entirely new growth, or, at least its convolutions are not perceptible in the

lower animals. With it there is the manifestation of a moral nature, which is displayed in proportion to its size. This then is the moral region, removed farthest from the influence of the body, and connecting it with the spirit. There enthroned it acts the sovereign, over the propensities of love, and kindness and, smiles at the approach of death, which lifts the curtain that conceals from mortal vision, the ennobling futurity which awaits the immortal spirit.

To the cerebrum, nerve fibres from every part of the body concentrate. The nerves of sensation from the fine capillary ram-

ifications in the heart of organs, and over the surface of the viscera, and skin, send up their fibres to transmit intelligence with the central office. and. side by side returning in an opposite direction, send off nerves of volition, along which circulate messages to appropriate organs to contract, or expand, according to the nature of the information received.

The nerve fibres are hollow tubes, and from their origin, to their termination are continuous throughout, never uniting with other fibres, so that the minutest capillary is in direct communication with the brain; forming

a continuous tube. In the minute division of their capillaries, the fibres of volition unite with those of sensation, and form a circuit to, and from the brain. In a similar manner, are the excito-motor filaments connected; but the circuit formed by these, terminate in a spinal ganglion. If a motor fibre be traced from its termination, to its source, it will be found to terminate in a ganglion: while a volitional fibre can be traced directly to the brain. Throughout their whole extent, the smooth and parallel fibres remain identically the same. They cannot generate nervous influence: but serve

simply to transmit the generated power.
This is proved by severing a nerve.
When the nerve of a limb is severed, all volition and sensation ~~is~~ are lost in the part, and even the excito-motor function is lost, if the nerve no longer connects with a ganglion. Sensation and volition therefore do not reside in the nerves themselves, but at their origin, whether it be ganglion or brain.
This is one step toward the determination of their nature and function. Thus by the simple severing of a nerve, we prove that nerve influence, is confined to the ganglionic centres; these are composed of the terminations of the nerve

fibres, and a gray matter, differing entirely from the nerve substance.

This gray matter is found only spreading around the extremities of the nerves. To one, or the other, must be assigned the source of nervous influence, and physiologists by the most close, and careful study, concur in assigning it to the gray substance, calling the nerve fibres but conductors.

The next question is, How is the nerve power generated? Physiology is silent; it records the fact and asks the question— From whence is it derived? But how it knows not.

Anatomy throws but feeble light

upon the subject. The professor, over the dead brain, dissects fibre from fibre, and gives to each a high-sounding name; But his real knowledge goes no farther than the mere exercise of his memory, and the mere externals of mechanics. The life that vivified the organ is gone; All its pulsating centres are still; the blood is stagnant in its vessels; it throbs not, it thinks not, nor gives a clew to the process, by which in the flush of life, it manifested divine thought, or the gush of emotion. But thought has been produced in that brain, and brains like that are producing thought. How? look at the gray substance which coats the

cerebrum. It is entirely made up of cells - globular bodies, filled with a peculiar limpid fluid. Upon the exterior they appear newly formed or immature, but as they approach the fibres they become perfectly formed, and disappear. What is their office? They certainly are not useless, nor is their continual growth, and decay, unattended with useful results.

The brain receives one fifth of the entire mass of blood in the system. It flows into it as pure, arterial blood, and comes away loaded with refuse matter - a dark, sluggish, venous current. It has been at work and has

produced great changes in that organ.
We find that it has principally circulated through the gray neurine which, from the innumerable capillaries, which circulate through it, is a complete mesh of bloodvessels. There, then, it has performed its mission, whatever that may be. As the amount of blood which an organ receives is in proportion to the amount of exercise to which it is subjected. and as the fibres of the nerve, only transmit nervous influence, it would not be expected that they would require any great amount of blood; but in that region where the power is generated a great

amount would be required.
The fact that the cells of the gray neurine are immature upon the surface, shows that there they are formed, while their maturity as they approch the fibres, shows that they are forced inward by the growth of new cells upon the outside. Their formation uses up the great amount of blood sent to the brain, but the brain becomes no larger from their constant production, and the amount of gray neurine remains the same.
We conclude then that the cells are used up in the proces by which thought is manifested. They are crowded inward, and, when they come in

contact with the nerve fibres they disappear. Do they pour their contents back into the blood? No; for that could subserve no possible purpose; then they must pour it into the nerve tubes or fibres. as they furnish the only possible means of absorption.

The analogy between the brain, and the secreting organs is remarkable, and has been frequently mentioned. In fact, its office includes that of secretion, and hence the analogy. Nervous matter contains a greater proportion of phosphorus than any other tissue of the body, with the exception of the bones. That intense thought necessitates the waste of nerve cells, is evident from the remarkable increase

of prosphorus in the secretion of the kidneys, after intense thought. The waste is not of the fibrous structure, but, necessarily of the gray neurine.

To manifest thought the cells pour their contents into the nerve fibres, and this fluid after performing its mission, must enter the blood and effect its properties, before being secreted by the kidneys as waste and effete matter. We here have a reason for the greater flow of blood to the brain during intense thought. As every thought necessitates the waste of the cells a greater amount of blood must circulate to repair the damage. So-fast as the cells are used up, so fast must their place be supplied, and

if the mind is constantly active, the circulating vessels enlarge, and the brain itself increases in size

Again - why can we not constantly think in one channel? The mind tires; there are bounds which it cannot pass, and if driven beyond that bound it becomes prostrated, and complete lassitude ensues. The explanation of this is simple. A peculiar train of thought calls into activity certain regions of the brain. The intensity of the thought determines the rapidity of the distruction of the cellular neurine. This predisposes the flow of blood to those regions; soon they become inflamed; they cannot answer the demand; and then the

mind in that direction is prostrated. while in other channels, where new regions of the brain are brought into action, the mind may be perfectly healthy and strong.

Wherever the cellular neurine is formed, we observe accompanying nervous actions; and all recorded facts are in harmony with the proposition, that the nerve power resides in this cell matter. On this the nerve tubes originate, and go out to every part of the body as nerves of volition; and return as nerves of sensation, terminating in the same place they originated. Around their extremities lies the source of their power-the

cell neurine. Impressions acting upon the surface of the body are transmitted by appropriate fibres, and there produce sensation, causing the destruction of cellular matter, in transmitting the return message.

The influence of the nerves is widely felt in the secreting and elaborating processes of the body. Every movement in the organism is ultimately referable to them. The secreting organs are largely supplied with nerves, and the nature of their secretion on them entirely depends. Thus if the mind is agitated with intense grief or anger, the lacteal, and salivary secretions, become bitter and

poisonous, showing that the nature of the secretion depends upon the kind of influence conveyed by the nerves. Whether that influence is exerted to keep the diaphragm in perpetual motion, to secrete bile in the liver, gastric juice in the stomach, or milk in the breast the law remains the same. It is worthy of remark that all these similar processes go on independently of the will and are as well executed after paralysis as before, because their functions depend upon the spinal axis. The nerves which go out to influence the functions, originate in ganglia of their own, from which they receive the stimuli appropriate to

their function. We would not be understood as maintaining that the mind is originated by and dependent upon the body. But that it's manifestations are so produced is we think evident. The condition of the physical frame determines the degree and kind of thought that is manifested. The greatest thinker of his age, by one hour's sickness may lose all his mental powers, and when old age steals on him, he becomes a second child, as prattling, and foolish as he was at first. Reason wanes with the decay of the body, and when the latter dies, the first with a few faint flickerings, like a lamp without oil seems to expire with it.